20 Years of DOT&E
What Have We Learned & How Can We Make It Better

Reasons for Testing

- To deliver relevant increments of combat and support capability – a continuing challenge
- Systems that perform as advertised in the relevant environment – in hand
- Systems of systems that provide both the platform capability and the systems that enable the potential capabilities – the new challenge

Secondary at best: Testing to specifications
- Specifications not likely to be explicitly relevant to the future environment
- Transformational capabilities more often a surprise than a plan

The Legacy

- Requirements unrelated to combat reality
- Rudimentary testing in success oriented scenarios
- Combat discovery – some Vietnam examples
  - Fuzes – delivering explosives to the enemy
  - Air-air Missiles – frustration[10]
  - Caseless ammunition – realistic environment impact

The First Evolution

- Combat oriented requirements
- Commitment to performance testing
- Spiral development
  - Well defined performance and test requirements for each increment
  - But some excessive rigidity
    - F-15A top speed
    - AMRAAM compatibility
- The delivered product
  - Systems that served the combat forces by performing as expected but . . .

The First Evolution (cont)

- Binary approach – one or zero
- Exquisite performance definition
- Omnipotent foresight assumed
- Runaway cost and schedule
- Acquisition reform assumptions doomed to failure
  - Abandoned spiral development
  - Total Package Procurement - abandoned government authority and accountability

The Next Evolution

- Capability-based needs
  - Tolerant of threat variations
  - Essential in the more complex and unpredictable environment
- Return to spiral development and spiral testing
  - Spiral requirements and spiral test goals – not rubber requirements and goals
  - Fielding useful increments on the path to the capability-based goal
- System-of-systems needs
  - Optimize the system not the elements (platforms)
    - ISR, C2, platforms, weapons, etc.
  - Vastly more complex testing requirements

Capability-Based System of System Goals – Some Examples

- Precision Strike – strike any target anywhere in the world in any weather at any hour of the day in the face of any defenses to achieve the desired effect and only the desired effect
- Ballistic Missile Defense – defend the United States, our deployed forces and our allies by defeating ballistic missiles of all ranges in all phases of flight

The path to the capability-based goal is spiral development to field a system of systems with useful increments of capability

FCS – A System of Systems in a System of Systems